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6. (Amended) The laser system of Claim 4 further comprising:

112
a return signal laser responding to guard band interruptions as sensed by the trigger circuit generating a return signal to shut down or modify the signal level of the laser beam.

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REMARKS

Reconsideration and allowance of the claims in the application are requested.

Claims 1-21 are in the case. Claims 1, 2 and 3 have been rejected under 35 U.S.C.

§ 103(a) as unpatentable over USP 5,501,680 to J. L. Kurtz et al issued March 26, 1996 (Kurtz) in view of USP 5,461,692 to R. Nagel issued October 24, 1995 (Nagel).

Claims 4, 6, 8, 9, 10 and 11 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Kurtz, of record in view of Nagel, of record and in further view of USP 6,285,646 to J. Yoo, et al. issued September 4, 2001 filed November 4, 1998 (Yoo).

Claim 5 has been rejected under 35 U.S.C. § 103(a) as unpatentable over Kurtz, in view of Nagel of record and Yoo, of record and in further view of USP 4,922,480 to F. Bosch issued May 1, 1990 (Bosch).

Claim 7 has been rejected under 35 U.S.C. § 103(a) as unpatentable over Kurtz, of record in view of Nagel, of record and Yoo, of record and in further view of USP 5,345,455 to J. Gabriagues, et al. issued September 6, 1994 (Gabriagues).

Claims 12-25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kurtz, of record in view of Nagel, of record, and Yoo, of record and in further view of Bosch, of record and Gabriagues, of record.

Claims 13-20 have been rejected as the inherent method of the claimed apparatus.

USP 3,636,473, 5,247,866, 6,248,103, and 6,217,570 have been made of record but have not been relied upon.

Claims 1, 4 and 6 have been amended to clarify the invention with respect to the cited art. The rejection of claims 1-21 have been traversed.

Before responding to the rejections, Applicants would like to distinguish Kurtz, Nagel, Yoo, Bosch and Gabriagues from the present invention (Willner), as follows:

1. Kurtz discloses a medical device for the safe treatment of lesions. A central core laser is surrounded by four layers of optical fibers. Three layers of optical fiber serve as a boundary sensor. The fourth layer serves as a proximity sensor. The boundary and proximity layers include adjacent fibers for emitting infrared light and detecting the presence or absence of infrared light. A lesion is surrounded by a reflecting member, typically white adhesive tape. When the laser moves off of the lesion area the reflected infrared light detected by the boundary layers causes the laser to be turned off due to the difference in light reflected from the white reflecting member and the relatively dark lesion. Kurtz fails to disclose elements of Willner, as follows:

A. Kurtz discloses optical fibers surrounding a core laser and transmitting infrared light along with the laser toward a lesion surrounded by reflecting layer. When the laser beam moves off of the lesion the reflected infrared light is increased causing the laser to be deactivated. In contrast, Willner discloses a guard band of lasers beams surrounding a core laser beam, the guard band being monitored by an annular segmented lens ray which signals a turns off the core laser when any of the segmented elements does not receive a laser signal due to the interruption of the beam. Kurtz fails to disclose a receiver receiving a guard band beam. The

white adhesive tape reflects the infra red light from the LED back to the source and a receiving LED. Moreover, there is no interruption of the infrared signals from the boundary surfaces of Kurtz. Kurtz deactivates the laser beam when the reflected signal level to the boundary layered detectors exceeds a threshold.

B. Urtz discloses boundary layered sensors multiplexed and one ORd turn off to deactivate the laser when any of the signal paths detect a predetermined threshold level of reflected light from the reflecting surface. In contrast, Willner discloses the receiver provides a returned signal laser responsive to the receiver signals to shut down or modify the signal level of the laser beam when the guard beam is interrupted.

C. Kurtz discloses the boundary and proximity sensors responsive to the reflected light deactivating the laser via an OR gate. In contrast, Willner discloses a receiver provides a signal to a return laser at the source when one or more segmented receivers detect a break in the guard band signal. Thus, Kurtz fails to disclose a receiver detecting a break in the guard band beam.

2. Nagel discloses a single fiber optic which has one or more cladding layers and a buffer layer in which laser radiation transmitted through the core and cladding layer as if it were a number of different laser diameters whereby the laser can be focused at a minimum diameter with successively increasing diameters providing increasing efficiencies of output coupling.

Nagel fails to disclose elements of Willner, as follows:

A. Nagel discloses supplementary light for purposes of different radiation distribution for medical procedures. In contrast, Willner discloses laser light sources as guard beams for a central laser.

B. Nagel discloses a laser radiation core having a refractive index greater than the refractive layer of the surrounding cladding layers, each cladding layer having a greater refractive index than the surrounding cladding layer to obtain increasing diameter providing increasing efficiency of output. See column 5, lines 32-42. In contrast, Willner discloses guard beams of a laser materials different in frequency from the main laser beam to prevent cross talk between the main laser and guard beam laser. Nagel fails to disclose a central laser surrounded by a guard beam of different laser frequencies to prevent cross talk.

Summarizing, Kurtz and Nagel, alone or in combination, fail to disclose, suggest or teach a core laser beam surrounded by a guard laser, which when a receiver detects an interruption in the guard beam signal, initiates a laser return signal to the source to modify the core laser signal. Without a disclosure, suggestion or teaching in Kurtz and Nagel, alone or in combination, relative to the foregoing described elements, there is no basis under 35 U.S.C. § 103(a) for a worker skilled in the art to implement the laser system described in claims 1-21.

3. Yoo discloses an optical pick up device including an objective lens segmented into three areas: A1, A2 and A3. The inner area A1 is formed so that minimum optical aberration is simultaneously satisfied for recording and reproduction of the information with respect to a DVD and a CD-R medium. The area A2 is formed to having minimum optical aberration only with respect to the CD-R medium. The outer area, A3, is comprised of an optimized spherucal surface with respect to the DVD. As a result of reproducing the DVD, the light that passes through the inner area A1, and the outer area is detected when reproducing the CD-R medium. Yoo fails to disclose elements of Willner, as follows:

A. Yoo discloses an objective three-layered lens for focusing laser light on a recording surface of a medium which may be DVD, CD or CD recordable. In contrast, Willner discloses a segmented lens for receiving laser guard beam signals surrounding a core laser and detecting the absence of a guard beam signal for controlling the core laser source. There is no disclosure in Yoo of an annular, segmented set of mirrors and lens surrounding a central lens. Yoo only discloses annular rings surrounding a central core where none of the annular rings are segmented as receivers for purposes of detecting associated guard beam signals.

Summarizing, Kurtz in view of Nagel and Yoo does not disclose, suggest or teach a laser beam and a surrounding concentric guard laser projected onto a receiver including a central core and surrounding segmented set of mirrors as parallel receivers for receiving a guard laser beam. Kurtz, Nagel and Yoo, alone or in combination, fail to disclose, suggest or teach the foregoing elements because the elements of Kurtz, Nagel and Yoo would cooperate in a dysfunctional manner. Without a disclosure in Kurtz, Nagel and Yoo of the foregoing elements there is basis for a worker skilled in the art under 35 U.S.C. § 103(a) to implement claims 1 - 21.

4. Bosch discloses a control circuit utilized in conjunction with a thermo-electric cooler to provide a temperature/wavelength adjustment to a laser. An input signal is compared in a differential amplifier to an adjustable voltage generated in a potential annular coupled to a reference source. Any significant difference between the voltage and the reference results in an output control signal transmitted to the thermo-electric cooler. A negative signal is sent if cooling is required. A positive signal is transmitted if additional heating is required. The laser wavelength is controlled in accordance with the operating temperature. Bosch fails to disclose elements of Willner, as follows:

A. Bosch discloses a temperature sensor for determining the operating temperature of a laser to raise or lower the laser wavelength to within a specification. In contrast, Willner discloses a climatic sensor for detecting a driving rainstorm or dust clouds or detecting atmospheric conditions which would alter the performance of the guard band, but not the performance of the main laser. Bosch detects temperature changes whereas Willner detects climatic condition. Bosch raises or lowers the laser operating temperature to retain the laser wavelength whereas Willner prevents the turnoff of the guard band due to climatic conditions thereby continuing the main laser beam, not affected by the climatic condition.

Summarizing, Kurtz in view of Nagel and Yoo and in further view of Bosch do not disclose, suggest or teach a central laser beam surrounded by a guard beam and a receiver including an annular segmented set of mirrors and lens surrounding the laser beam, the receiver responsive to the guard beam modifying the laser beam when the segmented mirrors and lens detect a break in the guard band signal and continuing the laser beam when the guard beam is interrupted due to climatic conditions. A worker skilled in the art has no teaching in the cited references, alone or in combination, because the combination would not operate in the manner described by Willner. Accordingly, there is no support in Kurtz in view of Nagel and Yoo and in further view of Bosch under 35 U.S.C. § 103(a) for the rejection of claims 1-21.

5. Gabriagues discloses an optical wavelength converter adapted to receive an optical signal whose wavelength is to be converted. Buffer circuits 161, 162, 131, 132 are coupled to a RAM for sampling output data at a time determined by a clock. The sampling is conducted according to the required time of application of a control signal to a wavelength control electrode via a digital to analog converter where the RAM includes control data representing the required wavelength for the optical output signal. Gabriagues fails to disclose

elements of Willner, as follows:

A. Gabriagues discloses a buffer circuit for sampling output data from a RAM containing control data representing a required wavelength for an output optical signal. In contrast, Willner discloses a buffer which stores the laser signal when turned off due to the guard band interruption and returns the laser signals when the laser returns to normal state. Gabriagues fails to disclose a buffer for storing a laser signal when deactivated and returning the stored laser signal when activated.

Summarizing, Kurtz in view of Nagel and Yoo and in further view of Gabriagues fails to disclose, suggest or teach a laser beam surrounded by a guard beam and a receiver which modifies the laser beam when an annular, segmented, mirrors and lens in the receiver detect the absence of a guard beam signal. A buffer circuit stores the received laser signal until the laser is reactivated. The elements of Kurtz, Nagel Yoo and Gabriagues do not operate in the manner described by Willner for the reasons set forth above. Without a disclosure, suggestion or teaching in the cited references, alone or in combination, relative to the elements described above, there is no basis for a worker skilled in the art to implement claims 1 - 21. The rejection of claims 1 -21 under 35 USC 103 (a) fails for lack of support.

Before responding to the rejections of claims 1-21, Applicants attorney has no information from the Assignee that the invention date of each claim was not commonly owned at the time the invention was made.

Now turning to the rejections, Applicant provides responses to the rejected claims, as follows:

a. Claims 1, 2, and 3:

Claims 1, 2 and 3 include elements not disclosed, suggested or taught in Kurtz in view of Nagel, as follows:

(i) "... a guard band laser arranged concentric to the main laser and generating a guard band beam;"

Figs. 1 and 2 of Kurtz disclose a laser surrounded by optical fibers conducting infrared light. Nagel discloses a multi mode source of laser radiation. with the substitution of Nagel's multi mode laser source for the infrared light of Kurtz would render Kurtz inoperative because the wavelength of the Nagel light source would interfere with the radiation frequency of the laser or possibly the ambient operating room contrary to the Kurtz disclosure at col. 5, lines 13-20.

(ii) "... a receiver spaced from the laser for receiving the guard band beam;"

Kurtz discloses the infrared signals are reflected back by the operating surface to determine whether the laser beam has moved beyond the operating area. Nagel does not provide a reflected signal. Neither Kurtz nor Nagel disclose a receiver spaced from the laser for receiving the guard band beam.

(iii) "... a trigger circuit coupled to the guard band receiver, the trigger circuit generating a signal upon interruption of the guard band;"

There is no disclosure in either Kurtz or Nagel of the guard band signal being interrupted and activating a trigger circuit. Kurtz discloses the laser is modified when the reflected infra red signal exceeds a threshold. Nagel fails to disclose a reflected signal for laser modification purposes. Neither Kurtz nor Nagel disclose interrupting the guard band signal to modify the laser operation.

(iv) "... means responsive to the trigger circuit for altering the performance of the main beam upon interruption of the guard band beam."

Both Kurtz and Nagel fail to disclose the interruption of the guard band beam for altering the performance of the main beam.

Summarizing, Kurtz and Nagel, alone or in combination, fail to disclose, suggest or teach a guard band beam concentric to a laser beam and a receiver spaced from the laser for receiving the guard band beam and upon interruption of the guard band beam activating a trigger circuit coupled to the receiver for altering the performance of the main beam. Without a disclosure in Kurtz and Nagel, alone or in combination, of the previously described elements there is no support for the rejection of claims 1, 2 and 3 under 35 U.S.C. § 103(a). Moreover, a worker skilled in the art would not be inclined to substitute a laser for the infrared source of Kurtz when the laser beam would conflict with the main laser in the performance of a medical procedure. Withdrawal of the rejection of claims 1, 2 and 3 and allowance thereof are requested.

b. Claims 4, 6, 8, 9, 10 and 11:

Claims 4, 6, 8, 9, 10 and 11 include elements not shown or suggested in Kurtz in view of Nagel and in further view of Yoo, as follows:

c. Claim 4:

(i) "... a guard beam surrounding the laser beam as a protective layer;"

The optical fibers of Kurtz do not provide a protective layer for the laser beam but provide a protective layer for the operating area. In contrast, Willner discloses the guard beam insulates the main laser beam from interruption. If the guard is interrupted at any point along the

length of the beam a signal will be provided to alter the performance of the main laser beam including shutdown. See page 5, lines 3-10. Neither Kurtz, Nagel or Yoo disclose protecting the laser beam. Kurtz discloses protecting the operating area. Nagel relates to a multi mode laser source without the presence of a guard beam. Yoo discloses an optical pickup circuit without the presence of a guard beam.

(ii) "... a receiver spaced from the laser comprising a central lens for receiving a laser beam and coupled to the laser ;"

Kurtz discloses the reflected signal from the operating area is transmitted via optical fibers to the laser source for altering the performance of the laser. Kurtz fails to disclose a receiver coupled to the main receiver. Nagel only discloses a multi mode laser radiation source. There is no disclosure in Nagel coupling a receiver to the radiation source. Yoo discloses a lens for focusing a light laser source on an information media. The information source is coupled via the lens to a recorder circuit and not the laser source. All of the references fail a receiver coupled to the main laser. Kurtz and Nagel do not disclose a receiver. Yoo discloses a receiver is coupled to a recording source, not the laser.

(iii) "... an annular, segmented set of mirrors and lens surrounding the central lens as a set of parallel receivers for receiving the guard laser beams;"

The Examiner acknowledges that Kurtz and Nagel fail to disclose an annular segmented set of mirrors and lens surrounding the central lens. Yoo discloses an annular lens which is not segmented. Nor does the annular lens of Yoo function as a set of parallel receivers for receiving a guard laser beam. The annular rings of Yoo are for recording different media from an information source.

(iv) "... a trigger circuit connected to the set of parallel receivers for generating a signal upon interruption of the guard beam;"

Kurtz, Nagel and Yoo all fail to disclose a set of parallel receivers generating a signal upon interruption of the guard beam for the reason set forth in elements (i), (ii) and (iii). Kurtz uses a reflected signal, not an interrupted signal to alter laser operation. Nagel does not disclose a guard beam. Yoo does not disclose interrupting the recording beam.

(v) "... means responsive to the trigger circuit for altering the laser beam upon interruption of the guard beam." For the reasons indicated in elements (i) - (iv), there is no interruption of the guard beam in Kurtz, Nagel and Yoo.

Summarizing, Kurtz, Nagel and Yoo all fail to disclose a guard beam as a protective layer for a laser beam and a receiver coupled to the main receiver, the receiver including annular segmented set of mirrors surrounding the central lens as a set of parallel receivers and a trigger circuit coupled to the parallel receivers generating a signal upon interruption of the guard beam for altering the laser beam as indicated in the discussion of elements (i) - (v) above. A worker skilled in the art would be unable to implement claim 4 since the operation of Kurtz in view of Nagel are in conflict with the purpose of Kurtz and Yoo does not supply the missing element in Kurtz of a receiver including an annular, segmented set of mirrors and lens for receiving the guard laser beam. Without a disclosure in Kurtz, Nagel and Yoo, alone or in combination, teaching the laser system of claim 4 there is no support for the rejection of claim 4 under 35 U.S.C. § 103(a). Withdrawal of the rejection of claim 4 and allowance thereof are requested.

d. Claim 6:

(i) "... a return signal laser responding to the guard band interruption as sensed by the trigger circuit generating a return signal to shutdown or modify the signal of the laser beam."

There is no disclosure in Kurtz or Nagel of a return signal laser responsive to a return signal from the laser and shutting down or modifying the signal level of the laser beam. Kurtz discloses a reflected signal from the operating area and not a return signal laser responsive to return signal from the receiver. Nagel does not disclose a return signal through the laser source. Yoo discloses a return signal reflected to recording medium, not a return signal laser shutting down or modifying the signal level of the laser beam.

Without a disclosure, suggestion or teaching in Kurtz, Nagel and Yoo, alone or in combination relating to a return signal laser, there is no basis for a worker skilled in the art to implement claim 6. Withdrawal of the rejection of claim 6 under 35 U.S.C. § 103(a) and allowance thereof are requested.

e. Claim 8:

Claim 8 is patentable on the same basis as claim 4 from which it depends.

f. Claim 9:

(i) "... the guard beam is aligned in cone shape with respect to the laser beam."

There is no disclosure in Kurtz, Nagel and Yoo, alone or in combination, disclosing, suggesting or teaching cone shaped guard beam as described in the specification at

page 9, lines 1-5. Without a disclosure of a cone-shaped guard beam in Kurtz, Nagel and Yoo, there is no basis for a worker skilled in the art to implement claim 9. The rejection of claim 9 under 35 U.S.C. § 103(a) is without support. Withdrawal of the rejection of claim 9 and allowance thereof are requested.

g. Claims 10 and 11:

Claims 10 and 11 are patentable on the same basis as claim 4 from which they depend.

h. Claim 5:

(i) "... sensor means coupled to the trigger circuit for detecting climatic conditions and preventing shutdown of the main laser."

Kurtz, Nagel and Yoo fail to teach a climatic sensor means. Bosch discloses a temperature sensor not a climatic sensor. Bosch teaches changing the laser operating temperature to maintain a predetermined wavelength specification. There is no disclosure in Bosch or Kurtz, Nagel and Yoo for preventing shutdown of the main laser due to climatic conditions.

Without a disclosure in Kurtz, Nagel, Yoo and Bosch relating to a climatic detector there is no basis for a worker skilled in the art to implement claim 5. Withdrawal of the rejection of claim 5 under 35 U.S.C. § 103(a) is requested.

i. Claim 7:

(i) "... a buffer circuit for storing an input signal to a laser prior to shutdown."

Kurtz, Nagel and Yoo fail to disclose a buffer circuit for storing an input signal to the laser prior to shutdown. Gabriagues discloses a buffer circuit for sampling the output data from Ram at a time determined by a clock. Gabriagues fails to disclose storing the input signal to the laser in a buffer circuit prior to shutdown. Without a disclosure in Kurtz, Nagel, Yoo and Gabriagues relating to a buffer circuit for storing the laser signal prior to shutdown, there is no basis for a worker skilled in the art to implement claim 7. Withdrawal of the rejection of claim 7 under 35 U.S.C. § 103(a) and allowance thereof are requested.

j. Claims 12-21:

Claims 12 – 21 are a combination of claims 1 – 11 and include elements not shown or suggested in Kurtz, Nagel, Yoo, Bosch and Gabriagues, for reasons previously indicated in subparagraphs (a) – (g) discussed above. Without a disclosure in the cited references regarding the laser types and purposes there is no basis for a worker skilled in the art to implement claim 12. – 21. Withdrawal of the rejection of claim 12 – 21 under 35 U.S.C. § 103(a) and allowance thereof are requested.

CONCLUSION

Having amended claims 1, 6 and to clarify the invention with respect to the prior art and traversed rejections of claims 1-21 under 35 U.S.C. § 103(a), Applicants request entry of the Amendment, allowance of the claims and passage to issue of the case. Attachment A is included indicating the changes to the claims.

AUTHORIZATION:

The Commissioner is hereby authorized to charge any fees or insufficient fees or credit any payment or overpayment associated with this application to IBM Deposit Account No. 09-0452, Order No. BOC919990075.

Respectfully submitted,

MORGAN & FINNEGAN, L.L.P.

Dated: August 9, 2002

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Docket No. BOC919990075 (1963-7376)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :

Applicant: Willner et al. :

Serial No.: 09/593,076 : Group Art Unit: 2828

Filed: June 13, 2000 : Examiner: Gioacchino

For: A LASER SYSTEM AND METHOD OF OPERATION HAVING
IMPROVED SIGNAL CONTINUITY AND SAFETY**ATTACHMENT A – SHOWING MARKUP OF CHANGES**Commissioner for Patents
Washington, D.C. 20231

Sir:

The claims have been AMENDED as follows:

1. (Amended) A laser system comprising:
 - (a) a laser generating a main beam;
 - (b) a guard band laser arranged concentric to the main laser and generating a guard band beam;
 - (c) receiver spaced from the laser for receiving the guard band beam;
 - (d) a trigger circuit coupled to the guard band receiver, the trigger circuit generating a signal upon interruption of the guard band; and

(e) means responsive to the trigger circuit for altering the performance of the main beam upon interruption of the guard band beam.

4. (Amended) A laser system having improved signal continuity and safety, comprising:

(a) a laser including an energy source and optical surface in a chamber coupled to an energy pump and providing a laser beam;

(b) a guard laser concentric with the laser including an energy source and an optical surface in a chamber coupled to an energy pump and providing a guard beam surrounding the laser beam as a protective layer;

(c) a receiver **spaced from the laser** comprising a central lens for receiving the laser beam and coupled to [a main receiver] the laser;

(d) an annular, segmented set of mirrors and lenses surrounding the central lens as a set of parallel receivers for receiving the guard laser beam;

(e) a trigger circuit connected to the set of parallel receivers for generating a signal upon interruption of the guard beam; and

(f) means responsive to the trigger circuit for altering the laser beam upon interruption of the guard beam.

6. The laser system of Claim 4 further comprising:

a return signal laser responding to guard band interruptions as sensed by the trigger circuit [and] generating a return signal to shut down or modify the signal level of the laser beam.

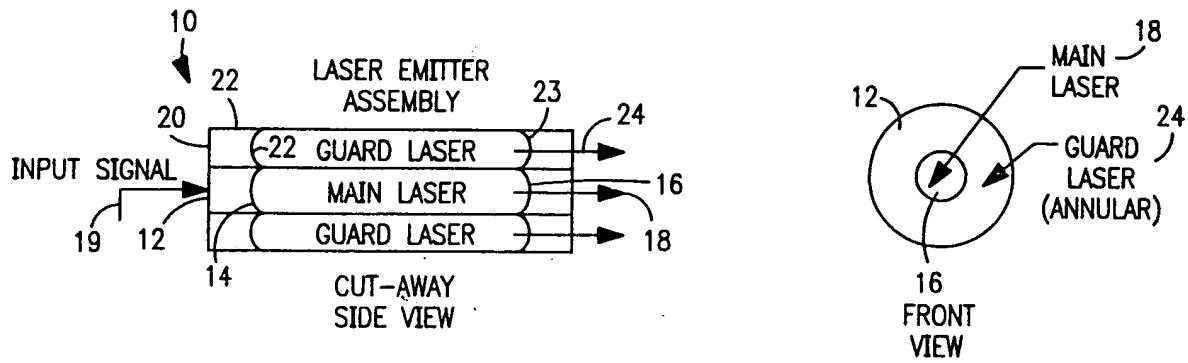


FIG. 1

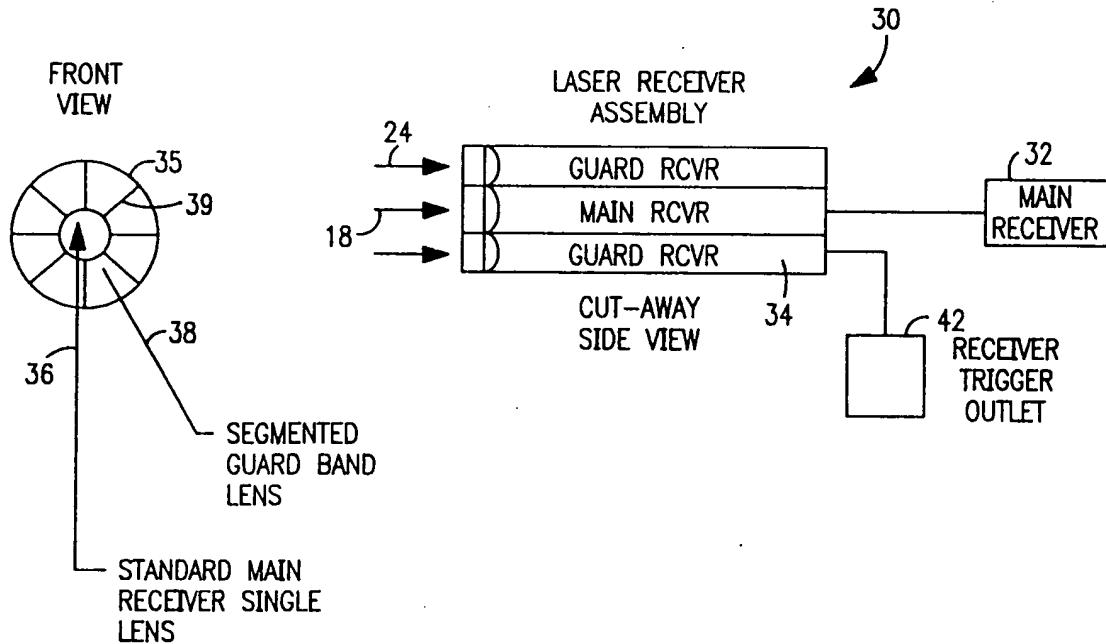


FIG. 2

FIG. 3

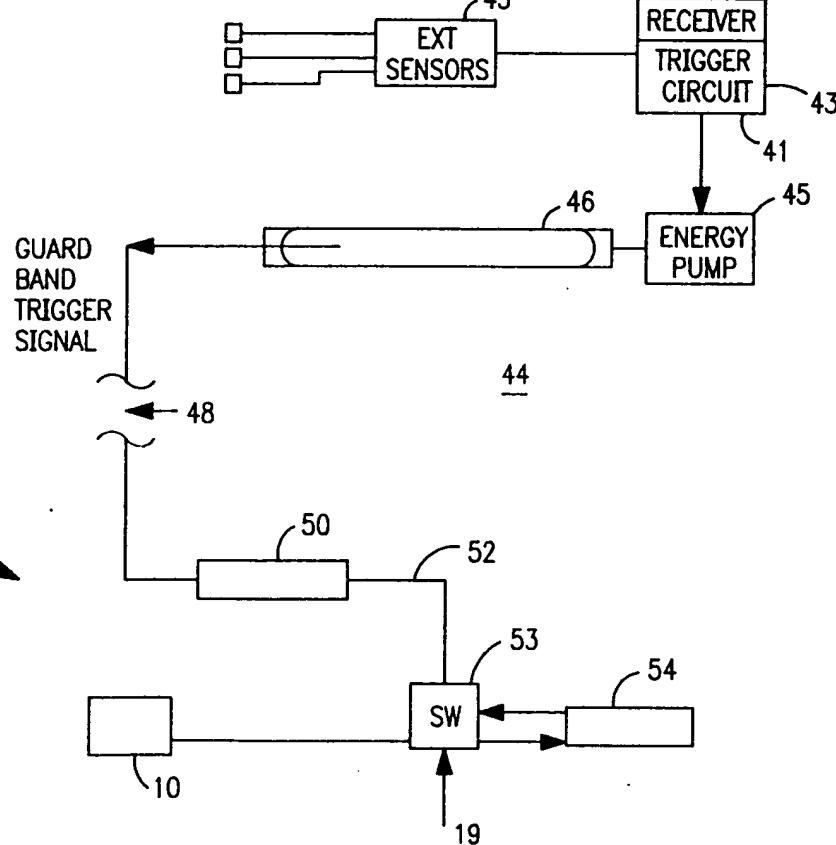
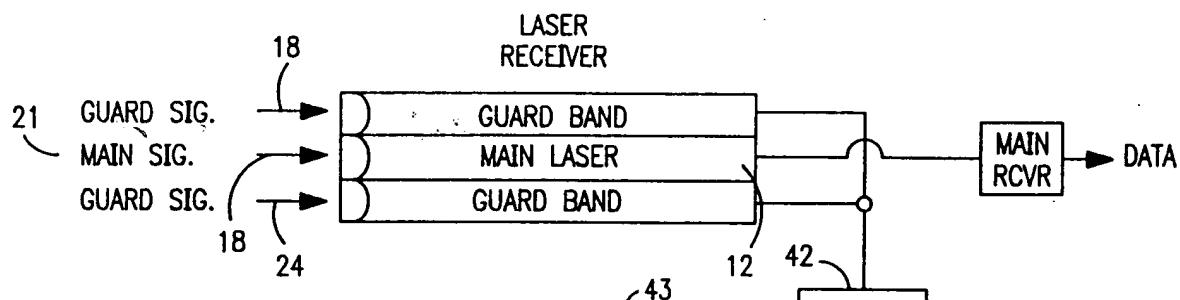


FIG. 4

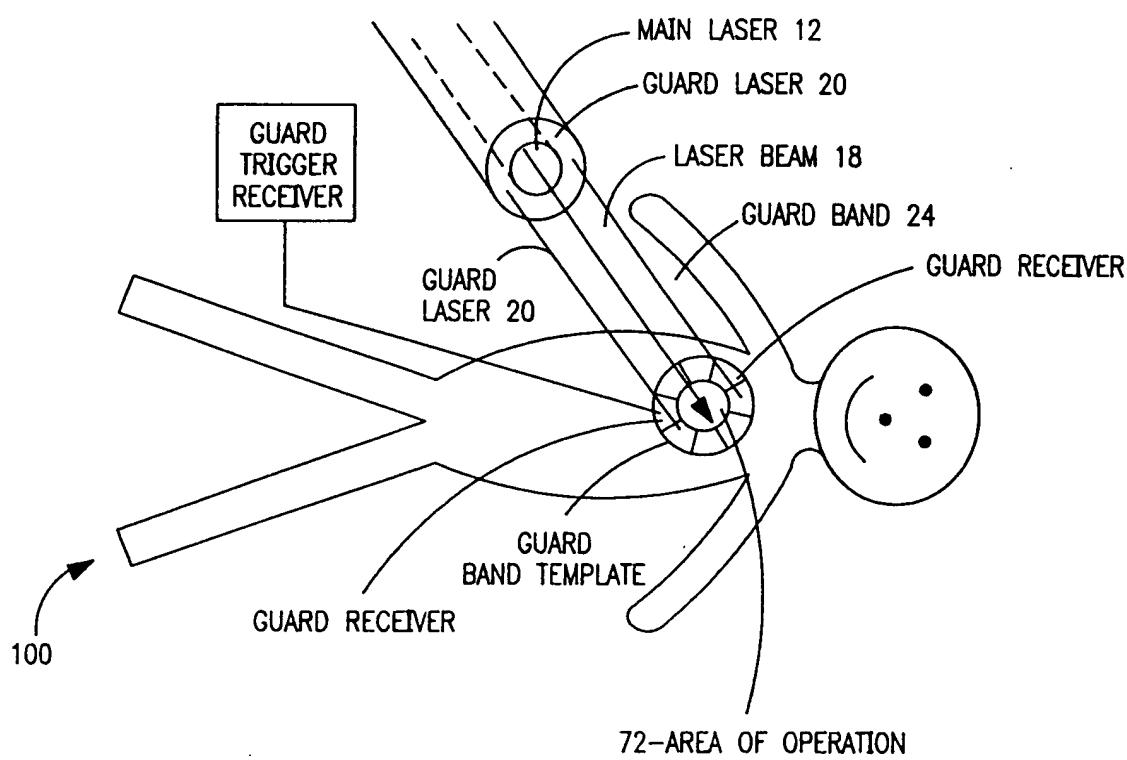


FIG. 5